HUMAN SKILL FACTORS THAT AFFECT ON DIGITAL TRANSFORMATION OF THE CONSTRUCTION INDUSTRY IN SRI LANKA

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This thesis is submitted in partial fulfilment of the requirements for the degree Master of Science in Construction Project Management

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DECLARATION

I, Jayasingha S.H.V.D., declare that this is my work, and this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning. To the best of my knowledge and belief, it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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Jayasingha S.H.V.D. Date

The above candidate has researched the Masters thesis under my supervision.

Prof.A.A.D.A.J. Perera

…… ……..

Date

Abstract

The world is leading to an Industrial revolution by automating and integrating novel construction technologies for efficient decision-making. However, the local Construction industry lacks to adopt state-of-the-art digital transformation techniques due to the lack of awareness, technical know-how, and a higher capital cost of those technologies. Literature reveals numerous research studies in this area have sufficient frameworks worldwide to improve human digital skill factors. However, there is a lack of information on improving human digital skill factors in the Sri Lankan context. Therefore, developing a comprehensive guideline to expedite the construction industry digitalization process in Sri Lanka is essential.

Available competencies and frameworks were identified using a Literature review. Required competency levels were categorized according to the complexity of the task, autonomy, and cognitive domain from Level 0 to Level 4 (No skill to Expert Level). For the ease of the data collection, the workforce was divided into 4 categories: Senior Management, Engineers/Architects, Quantity Surveyors and Storekeepers. /TO. A questionnaire survey was conducted with the help of industry experts for the local Construction Industry regarding digital transformation techniques, training, and consultation programs.

According to the analysis, 94% of respondents believe the construction industry needs to upskill its digital skills. In Sri Lanka, digital technologies such as Augmented Reality, Virtual Reality, Three-Dimensional Printing, Drones, Robotics, and the Internet of Things are relatively less than developed countries. Only 28% of the responders are experienced in Building Information Modelling (BIM) applications, while 53% are involved in productivity and planning apps, Communication and Document management systems and Enterprise Resource Planning. Moreover, it’s found that Senior Management and Middle Management need a higher digital skill competency level (Level 3) while the technical officer level needs a comparatively lower level of competency (Level 2). Senior management's active involvement is critical for the successful digital transformation process. This research's findings benefited the public and Private sectors in their construction digitalization process.

Keywords: Human Digital Skills; Construction Digitalization; Digital Transformation; Digital Construction

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S.H.V.D Jayasingha

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LIST OF ABBREVIATIONS

Abbreviation	Description
OECD	Organization for Economic Co-operation and Development
ICT	Information and Communications Technology
DIHK	Association of German Chambers of Commerce and Industry
BIM	Building Information Modelling
DQ	Developmental quotient
3D	Three Dimensional
IoT	Internet of Things
IT	Information Technology
5-D BIM	Five Dimensional BIM
DTM	Digital Transformation Monitor
DIGCOMP	The European Digital Competence Framework
UK	United Kingdom
CITB	Construction Industry Training Board
HR	Human Resources
VR	Virtual Reality
AR	Augment Reality
ERP	Enterprise resources planning
DTM	Digital Transformation Monitor